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Validation of Velocimetry Techniques using Synthetic Diagnostics in Edge Turbulence Simulations Y. SECHREST, B. BROWN, T. MUNSAT, N. SEN, University of Colorado, X. XU, LLNL, S. ZWEBEN, PPPL — The HOP-V (Hybrid OPtical-flow Velocimetry) code, developed for extracting time-resolved 2-D velocity maps from turbulence imaging diagnostics, combines optical-flow and local pattern-matching techniques to derive "dense" velocity fields at the full temporal resolution and a fraction of the spatial resolution of the underlying image frames, often tens of pixels per side and thousands of timepoints in duration, with temporal and spatial resolution sufficient to resolve the relevant turbulent structures. The code has been validated for a variety of artificial test patterns of convective flow, including highly sheared cases. Beyond verifying the validity of the velocimetry algorithms for extracting the true motion of the visible structures lies the physical interpretation of the derived velocity fields. To approach this question, we have implemented a synthetic diagnostic (similar to the Gas Puff Imaging instrument) to analyze the output of the BOUT edge turbulence simulation. Here we present the results of a study directly comparing the derived velocity fields to the known plasma quantities from the simulation, in an attempt to define the connection between the observed velocities and underlying plasma behavior.

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